The Late Results of Uretero-Intestinal Implantation

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THERE are three procedures for the permanent diversion of the urine from the bladder—implantation of the ureters to the skin, implantation into the intestinal tract, and nephrostomy. The objections to the first and third are obvious. Very few surgeons now use either when intestinal implantation is feasible. Exstrophy and infiltrating carcinoma of the bladder are the two common abnormalities which require permanent bilateral diversion of the urine. Ureteroenterostomy is now standard treatment for the former and is being used more and more in connection with cystectomy for cancer. There is reason, therefore, to review the late results of uretero-intestinal implantation.

The author's records show that 135 patients, 31 with exstrophy, 84 with vesical carcinoma and 20 with intractable conditions (nine with incurable vesicovaginal fistula, 11 with tuberculous cystitis and with hopelessly contracted bladder) have had ureteroenterostomy. Exstrophy can be successfully repaired after diversion of the urine without aftereffects and therefore gives the best opportunity of knowing the long term survival, the state of health and rehabilitation, after ureteral transplantation in itself.

The late results after transplantation in the other conditions, cancer particularly, are affected by the degree of success in the treatment of the malignant lesion. These facts are of vital importance in the cure of the conditions, of course, but complicate the picture so far as survival from the transplantation itself is concerned. The late results in exstrophy, therefore, give a truer picture of what to expect from the implantation of the ureters into the bowel as a surgical procedure alone. There is, however, this difference: Ureterorectosigmoidostomy usually is done in infancy or early life for exstrophy, but always in late adulthood or even senescence for cancer, and the older patients frequently already have back-pressure changes in the ureters and kidneys which also affect the result. This back-pressure change occurs sometimes in exstrophy when its correction is too long delayed. If there were no recurrence of cancer after transplantation and back-pressure changes were not present in the upper tract before, the late results in the two conditions with normal upper tracts should be about the same except for the difference in expectancy of life. As every child born in this country now has a life-expectancy of over 65 years, operation in infancy permits the observation of a life-span and will tell how long and in what state of health an individual can live after the ureters have been implanted permanently to drain all the urine into such a highly and continuously infected field as the rectosigmoid —requiring adjustment to a state comparable to that which is natural in aves and in some reptilia (ureters opening into the cloaca).

Twenty-five of the 31 patients with exstrophy are living. Four were surgical deaths. Two patients died of acute peritonitis five and eight days after transplantation by the Coffey method before the days of succinylsulfathiazole (1925 and 1930). A modification of the submucous principle,* a principle so well popularized by Coffey in 1912, has been used since 1934 without one instance of peritonitis. This modification consists essentially in anchoring adventitia of the ureter to submucosa of the bowel at the point of its penetration by the ureter. In those patients in whom the wall of either ureter is thin from dilatation, these anchoring sutures cannot be used with safety on account of the risk of puncturing it, with subsequent leakage of urine. The Coffey-Mayo technique has been used as a rule in those instances. With the advent of succinylsulfathiazole, however, the risk of peritonitis is minimal provided whatever method is used is secure against leakage afterwards.

A third patient, four months old, with exstrophy died 2 days after operation and at autopsy, extensive necrosis of the ends of both ureters with leakage was found. The reason for such early operation, namely a relatively sterile bowel, is no longer valid with succinylsulfathiazole and the embryonic condition of the tissues as found in this patient increases the surgical risk. Between one and two years is now thought to be the optimum age for operation. The fourth case, a child of 16 months, died from an anesthetic. With improved methods of preparation and technique (removing the risk of peritonitis), the surgical risk may be estimated conservatively for this group to be well under 5 per cent. The other deaths occurred, respectively, seven years and nine months after operation. The cause of death of the former is unknown. On last examination, five years after operation, he was well, but his mother wrote in answer to a questionnaire after his death: "He had sick spells at intervals when he lost appetite and much weight but had always rallied quickly and built up strength. He was able to attend public school and had just been promoted to the third grade. He was not quite as active as other children, but was well and quite a happy little fellow most of the time." It is probable, therefore, that death followed an attack of recurrent pyelonephritis.

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*"The Technic and Late Results of Uretero-intestinal Implantation, and Cystectomy for Cancer of the Bladder." (The original report was published in September, 1939, in the Transactions for the Seventh Congress of the International Society of Urology scheduled to be held in New York but postponed on account of the war. A revision was presented August 26, 1947, in St. Moritz, Switzerland at the Seventh International Congress, and will be published in the 1947 Transactions.)

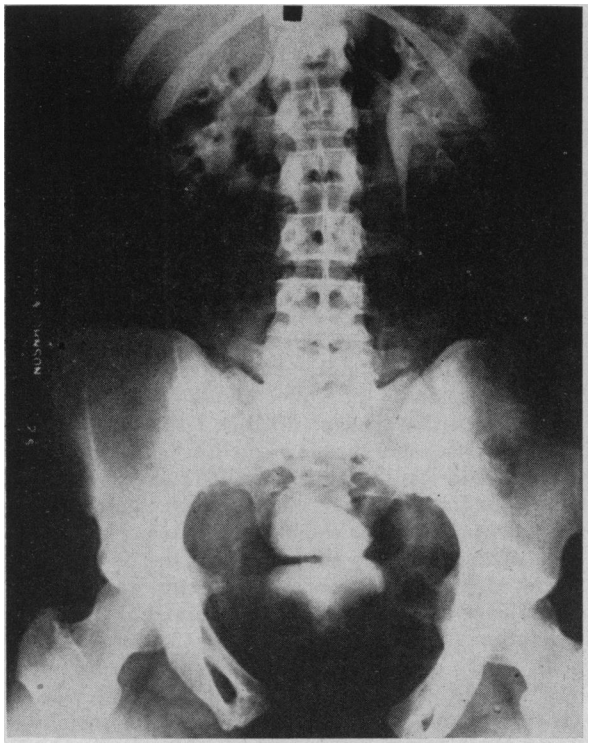

Figure 1.—Photograph of an intravenous urogram taken July 28, 1947. The left ureter was implanted into the rectosigmoid in 1919, the right in 1920 and a plastic repair of the external genitalia was done in 1924. She has been and still is well and active. She married, became pregnant, had an uncomplicated period of gestation and was delivered of a normal child by Cesarean. Urinary control is perfect and nocturia rarely occurs. So far as one can judge clinically, she has never had an attack of pyelonephritis. One could imagine no more perfect result.

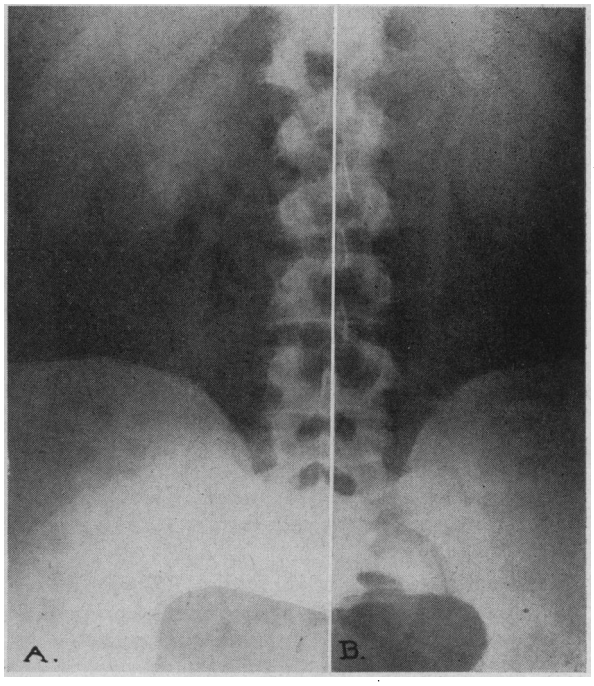

Figure 2.—Photograph of an intravenous urogram (a, right; b, left) taken in June, 1946, 14 years after bilateral ureterorectosigmoidostomy at the age of 10 years, showing some hydronephrosis on the right.

The cause of death in the latter case was some form of shock following cystectomy and plastic repair of the external genitalia. The note on her history is as follows: "Patient was returned to the ward in apparent good condition. However, within a very few minutes she became cyanotic, respirations ceased, and she expired. Efforts at resuscitation failed. Permission for autopsy was granted. No cause could be found at autopsy for the child's death. Moderate bilateral hydronephrosis, moderate hydro-ureters. The openings into the bowel were patent, well healed with little inflammatory reaction. There was no gross evidence of pyelonephritis."

Of the 25 patients with exstrophy who are living, 18 have survived more than six years, seven of these more than 10 years and four of these more than 15 years since operation. Of these four, three are in good health 28 years (Figure 1), 18 years, and 15 years (Figure 2) respectively, two with normal-looking ureteropyelograms; the fourth was as well as the others for 20 years and had married but for some unknown reason then began to have attacks of pyelonephritis with pyelographic evidence of urinary back-pressure (the regular follow-up series of intravenous urograms before having been normal). Unilateral nephrectomy and permanent nephrostomy on the other were performed since which the patient has been getting along quite well for the last two years (it is 23 years since the original ureteral transplantation). Another patient surviving 12 years had to have permanent nephrostomy 10 years after operation, and still another 10 years after ureteral transplantation shows well-marked hydronephrosis which may require nephrostomy later. This patient had considerable hydronephrosis when operated on. Some of the remaining 19 patients have occasional attacks of fever, readily controlled by the modern urinary antiseptics, and most of these show varying degrees of ureteropyelectasis, present however in many of them before operation; a majority of the 19 are in good health.

This review of 31 patients with exstrophy of the bladder indicates that a long term survival in good health can be expected after successful ureteral transplantation into the rectosigmoid and the risk of the method therefore does not contraindicate its use in the radical treatment of cancer of the bladder.